WHAT IS CLAIMED IS:

1. A remote plasma enhanced cleaning apparatus comprising:

a main process chamber; and

a loadlock chamber connected to the main process chamber,

wherein the main process chamber comprises a staging device adjacent to the loadlock chamber for loading the silicon wafers from the loadlock chamber into the main process chamber and for unloading the silicon wafers from the main process chamber into the loadlock chamber;

carrier robot disposed in a center portion of the main process chamber, wherein the carrier robot rotates and moves around the center of the main process chamber and transfers the silicon wafers to an adsorption assembly, an anneal assembly, and a cooling assembly, and wherein the assemblies are disposed in the main process chamber around the carrier robot and spaced apart from one another.

2. The remote plasma enhanced cleaning apparatus of claim 1, wherein the adsorption assembly comprises two adsorption stages for holding the silicon wafers during an adsorption process.

3. The remote plasma enhanced cleaning apparatus of claim 1, wherein the adsorption assembly comprises an adsorption chamber comprising:

adsorption stages for holding the silicon wafers; and

a remote plasma generator disposed above the adsorption chamber to transform a N_2 gas, a H_2 gas, and a NF_3 gas into plasma, thereby forming active gas species.

4. The remote plasma enhanced cleaning apparatus of claim 3, wherein pins are disposed on the adsorption stages to separate the silicon wafers from the adsorption stages.

5. The remote plasma enhanced cleaning apparatus of claim 1, wherein the anneal assembly comprises two anneal stages for holding the silicon wafers during an annealing process.

6. The remote plasma enhanced cleaning apparatus of claim 1, wherein the anneal assembly comprises an anneal chamber comprising:

anneal stages for holding the silicon wafers; and

heating means for heating the silicon wafers on the anneal stages.

7. The remote plasma enhanced cleaning apparatus of claim 6, wherein the anneal chamber comprises heating wires disposed in the anneal stages and lamps disposed in an upper portion of the anneal chamber to heat the silicon wafers.

8. The remote plasma enhanced cleaning apparatus of claim 6, wherein pins are disposed on the anneal stages to separate the silicon wafers from the anneal stages.

9. The remote plasma enhanced cleaning apparatus of claim 1, wherein the cooling assembly comprises two cooling stages for holding the silicon wafers during a cooling process.

10. The remote plasma enhanced cleaning apparatus of claim 1, wherein the cooling assembly comprises a cooling chamber including cooling stages for holding the silicon wafers; and

cooling means for cooling the silicon wafers on the cooling stages.

11. The remote plasma enhanced cleaning apparatus of claim 10, wherein the cooling means comprises a gas supply pipe for supplying the cooling chamber with a cooling gas or cooling source supplies for supplying a cooling gas to the cooling source supply lines within the cooling stages.

12. A remote plasma enhanced cleaning apparatus comprising:

a main process chamber;

a loadlock chamber connected to the main process chamber, wherein the main process chamber comprises a staging device adjacent to loadlock chamber for loading silicon wafers from the loadlock chamber into the main process chamber and for unloading the silicon wafers from the main process chamber into the loadlock chamber,

a carrier robot disposed in a center of the main process chamber, wherein the carrier robot rotates and moves around the center of the main process chamber, and

an adsorption assembly disposed adjacent to the carrier robot in the main process chamber, wherein the adsorption assembly allows native oxide films on the silicon wafers to react with active gas species to form reaction films including a mixture of Si, N, H, and F, and wherein the active gas species are formed by transforming a N_2 gas, a H_2 gas, and a NF_3 gas into plasma;

an anneal assembly disposed adjacent to the adsorption chamber and the carrier robot in the main process chamber, wherein the anneal assembly heats and sublimates the reaction films on the silicon wafers, and

a cooling assembly disposed adjacent to the anneal assembly and the carrier robot in the main process chamber, wherein the cooling assembly cools the heated silicon wafers, wherein the carrier robot transfers the silicon wafers to and from the adsorption assembly, the annealing assembly, the cooling assembly and the staging device.

13. The remote plasma enhanced cleaning apparatus of claim 12, wherein the adsorption assembly comprises two adsorption stages for holding the silicon wafers during an adsorption process.

14. The remote plasma enhanced cleaning apparatus of claim 12, wherein the adsorption assembly comprises an adsorption chamber comprising:

adsorption stages for holding the silicon wafers;

a first gas injection pipe connected to a gas distributor located at an upper portion of the adsorption chamber, wherein a mixture of a N_2 gas and a H_2 gas is injected into the adsorption chamber via the first gas injection pipe;

a remote plasma generator to transform the mixture of the N_2 and H_2 gases into plasma using remote plasma to form the active gas species; and

a second gas injection pipe disposed at a side of the adsorption chamber to inject a NF_3 gas into the adsorption chamber.

15. The remote plasma enhanced cleaning apparatus of claim 12, wherein the anneal assembly comprises two anneal stages for holding the silicon wafers during an annealing process.

16. The remote plasma enhanced cleaning apparatus of claim 12, wherein the anneal assembly comprises an anneal chamber comprising:

anneal stages for holding the silicon wafers; and

heating means for heating the silicon wafers on the anneal stages to sublimate the reaction films on the silicon wafers.

17. The remote plasma enhanced cleaning apparatus of claim 16, wherein the anneal chamber comprises heating wires disposed in the anneal stages and lamps disposed in an upper portion of the anneal chamber to heat the silicon wafers.

18. The remote plasma enhanced cleaning apparatus of claim 12, wherein the cooling assembly comprises two cooling stages for holding the silicon wafers during a cooling process.

19. The remote plasma enhanced cleaning apparatus of claim 12, wherein the cooling assembly comprises a cooling chamber including cooling stages for holding the silicon wafers, and a cooling means for cooling the silicon wafers on the cooling stages.

5

20. The remote plasma enhanced cleaning apparatus of claim 19, wherein the cooling means comprises a gas supply pipe for supplying the cooling chamber with a cooling gas or cooling source supplies for supplying a cooling gas to cooling source supply lines in the cooling stages.

10